Office Action Summary	Application No.	Applicant(s)	
	10/549,904	KATO ET AL.	
	Examiner	Art Unit	
	Elizabeth Robinson	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 April 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. *20080415* .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Claim Rejections - 35 USC § 102

Claims 1-3 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Matijević et al. (US 5,318,797).

Regarding claims 1 and 2, Matijević (Column 1, lines 7-16) teaches hollow spherical particles of a metal compound. The hollow spherical particles can be prepared by heating polymer-metal compound coated spherical particles (Column 6, lines 52-61). When high wear resistance and strength are needed, the coating can be formed of aluminum compounds, such as alumina (Column 4, lines 12-20 and Column 7, lines 36-47). The core of the particle is removed by heating the particle which decomposes the polymer core into gasses which are emitted through the shell (Column 6, lines 52-61). Thus, the ceramic shell is porous. The polymer particles are coated with a layer of metal compound particles (Column 5, lines 12-33). The spheres can be heated to 1000ºC (Column 7, lines 10-30) which would bind the metal compound (ceramic) particles to each other. The particles have an outer diameter of 0.07 to 30 microns (Column 3, lines 1-12). This range overlaps the range of the instant claim. The ratio of the core diameter to the outer diameter is 0.40 to 0.95. With the size of the particles and this ratio, the shell can have a thickness that meets the limitations of claim

2. Matijević (Column 7, line 1-4) teaches that the particles have a high strength, but does not teach the breaking strength of the particle. However, the particle can be formed of the same material (alumina), can be the same size and have the same shell thickness as those of the instant application, and are sintered which would form a high strength shell. Thus, the spheres of Matijević should inherently meet this breaking strength test.

Regarding claim 3, Matijević (Table 2-2, Columns 17 and 18) teaches a coated particle that has a shell formed of alumina and aluminum hydroxide.

Claim Rejections - 35 USC § 103

Claims 1-5 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barron et al. (US 2004/0224155).

Regarding claim 1, Barron (Paragraph 37) teaches a porous hollow alumina (ceramic) sphere. The spheres are formed from 1-80 micron polystyrene beads that are coated with an aqueous solution of acetate-alumoxane (A-alumoxane) (Paragraphs 39-40). The thickness of the coating layer is about 1 micron or greater (Paragraph 45). Thus, the range of particle sizes overlaps the range of the instant claim. The A-alumoxane is prepared by the method described in Callender et al. (Aqueous Synthesis of Water-Soluble Alumoxanes: Environmentally Benign Precursors to Alumina and Aluminum-Based Ceramics), which is incorporated by reference in the Barron publication. Callender (Page 2422) teaches that the alumoxane films are formed of particles (powders). Barron (Paragraph 42) teaches that the alumoxane is converted to

alumina, the polystyrene cores are removed and then the spheres are fired to form the alumina shell. The firing step bonds the ceramic material together. Barron does not explicitly teach the breaking strength of the particles. However, Barron (Paragraph 46) teaches that the spheres have a hardness that is approximately as hard as corundum. This mineral is second only to diamonds in hardness. With this high degree of hardness for the spheres, it would be obvious to one of ordinary skill in the art that the spheres should meet the breaking strength limitation.

Regarding claim 2, Barron (Paragraph 45) teaches that the shell layer has a thickness of approximately 1 micron for a 2 wt% A-alumoxane solution and that thicker walls are formed with increasing alumoxane concentrations. It would be obvious to one of ordinary skill in the art to vary the concentration of the alumoxane solution to obtain a desired thickness as is taught by Barron.

Regarding claim 3, Callender (Figure 11, Page 2427) teaches that there is a range of particle sizes for the A-alumoxane particles.

Regarding claims 4, 5, 8 and 9, Barron (Paragraph 55) teaches that the particles can be used in the formation of a polymer matrix composite. Regarding the limitation that the ceramics powder is embedded into the resin powder, Barron (Paragraph 43) teaches that the spheres are treated at a temperature of 220 °C prior to removal of the polystyrene core. This temperature is above the glass transition temperature of polystyrene and thus some degree of embedding of the particles will occur. Further it is noted that this step is a process limitation. The patentability of a product is independent of how it was made. Ex parte Jungfer 18 USPQ 1796, 1800 (BPAI 1991); Brystol-Myers

Co. v. U.S. International Trade Commission 15 USPQ 2d 1258 (Fed. Cir. 1989). The burden is on applicants to show product differences in product by process claims. In re Thorpe 227 USPQ 964 (Fed. Cir. 1985); In re Best 195 USPQ 430 (CCPA 1977).

Regarding claim 7, all materials have some degree of sliding capability and thus, the polymer matrix composite can be considered a sliding member.

Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamimura et al. (US 5,223,213), in view of Barron et al.

Kamimura (Column 1, lines 7-12) teaches a cylinder head or piston that comprises a ceramic insert. The product is formed by coating ceramic core particles with metallic coating particles, forming a compact of the capsule particles, sintering the compact and then casting cast iron over the sintered body (Column 3, lines 38-47). This product comprises ceramic particles in a metal matrix. The ceramic particles are preferably hollow, have a diameter of approximately 10-500 microns and can be alumina ((Column 2, line 67 through Column 3, line 5). The ceramic particles are added to improve the strength of the product (Column 3, line 66 through Column 4, line 9). Kamimura does not teach making the hollow ceramic particles. As stated above, Barron teaches strong, hollow alumina spheres that have an appropriate diameter that meets the range of Kamimura. It would be obvious to one of ordinary skill in the art to use the hollow alumina spheres of Barron, as the spheres of Kamimura, as they meet the requirements of the materials for the core particles and have high strength.

Regarding claims 1-3, as stated above, the spheres of Barron have appropriate strength such that they should meet the limitations of the instant claims.

Regarding claims 4-6 and 8 and 9, as stated above, the product of Kamimura comprises hollow ceramic particles in a metal matrix.

Regarding claim 7, a piston is a sliding member.

Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamimura et al. (US 5,223,213), in view of Matijević et al.

Kamimura (Column 1, lines 7-12) teaches a cylinder head or piston that comprises a ceramic insert. The product is formed by coating ceramic core particles with metallic coating particles, forming a compact of the capsule particles, sintering the compact and then casting cast iron over the sintered body (Column 3, lines 38-47). This product comprises ceramic particles in a metal matrix. The ceramic particles are preferably hollow, have a diameter of approximately 10-500 microns and can be alumina ((Column 2, line 67 through Column 3, line 5). The ceramic particles are added to improve the strength of the product (Column 3, line 66 through Column 4, line 9). Kamimura does not teach making the hollow ceramic particles. As stated above, Matijević teaches strong, hollow alumina spheres that have an appropriate diameter that meets the range of Kamimura. It would be obvious to one of ordinary skill in the art to use the hollow alumina spheres of Matijević, as the spheres of Kamimura, as they meet the requirements of the materials for the core particles and have high strength.

Regarding claims 1-3, as stated above, the spheres of Matijević have appropriate strength such that they should meet the limitations of the instant claims.

Regarding claims 4-6 and 8 and 9, as stated above, the product of Kamimura comprises hollow ceramic particles in a metal matrix. Regarding the limitation that the ceramics powder is embedded in the resin powder, this step is a process limitation. The patentability of a product is independent of how it was made. Ex parte Jungfer 18 USPQ 1796, 1800 (BPAI 1991); Brystol-Myers Co. v. U.S. International Trade Commission 15 USPQ 2d 1258 (Fed. Cir. 1989). The burden is on applicants to show product differences in product by process claims. In re Thorpe 227 USPQ 964 (Fed. Cir. 1985); In re Best 195 USPQ 430 (CCPA 1977).

Regarding claim 7, a piston is a sliding member.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Robinson whose telephone number is (571)272-7129. The examiner can normally be reached on Monday- Friday 8 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on 571-272-1284. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ear
/E. R./
Examiner, Art Unit 1794

/Carol Chaney/
Supervisory Patent Examiner, Art Unit 1794